



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/972,178	10/09/2001	Hanae Shimokawa	500.38665CX1	5052

20457 7590 07/21/2003

ANTONELLI, TERRY, STOUT & KRAUS, LLP
1300 NORTH SEVENTEENTH STREET
SUITE 1800
ARLINGTON, VA 22209-9889

EXAMINER

ZIMMERMAN, JOHN J

ART UNIT	PAPER NUMBER
----------	--------------

1775

DATE MAILED: 07/21/2003

16

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application N .

09/972,178

Applicant(s)

SHIMOKAWA ET AL.

Examiner

John J. Zimmerman

Art Unit

1775

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 30 June 2003.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 6-14, 19-23, 43-49, 62-67, 70, 71 and 78-83 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

- 5) ☐ Claim(s) _____ is/are allowed.

- 6) ☒ Claim(s) 6-14, 19-23, 43-49, 62-67, 70, 71 and 78-83 is/are rejected.

- 7) ☐ Claim(s) _____ is/are objected to.

- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☒ Certified copies of the priority documents have been received in Application No. 09/581,631.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ 6) ☐ Other:

FINAL OFFICE ACTION

Amendments

1. This Office Action is in response to the Amendment and Declaration Under 37 CFR 1.132 received June 30, 2003. Claims 6-14, 19-23, 43-49, 62-67, 70-71 and 78-83 are pending in this application.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 6-14, 19-23, 43-49, 62-67, 70-71 and 78-83 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tanimoto (U.S. Patent 6,110,608).

4. Tanimoto discloses forming electronic lead materials with a first coating of Sn-Bi alloy and a second solder coating which may be a Sn-Bi-Ag alloy (e.g. see column 3, line 63 - column 4, line 62). Specific examples of the Sn-Bi and Sn-Bi-Ag materials can be found in the tables (e.g. see Example 33 in Table 3 for specific Sn-Bi-Ag composition considered part of Tanimoto's

Art Unit: 1775

invention and also see Example 44 in Table 3 which shows that reflowing dual Sn-Bi layers is considered part of Tanimoto's invention). The electrodes of Tanimoto may be copper plated (e.g. see column 6, lines 33-44). Of particular relevance to the pending claims, Tanimoto specifically discloses that his invention also covers embodiments wherein the two-layer structure plated layers are melted, and the components such as Bi or Ag, contained in a new plated layer formed during re-solidifying after melting are in the state of dilution by Sn (e.g. see column 6, lines 7-19, for two-layer reflowed into a layer with lower overall Bi content). Therefore, it is clearly understood by one of ordinary skill in the art that reflowing Tanimoto's two layer embodiments so that they become a reflowed layer is also considered by Tanimoto to be his invention.

5. Tanimoto may differ from the claims in that Tanimoto may not disclose the use of various substrates (e.g. Fe-Ni alloy) or various types of leads (e.g. TSOP leads). The examiner, however, had previously taken Official Notice that Fe-Ni alloy is conventionally used in the art as an alternative to copper alloy leads for semiconductor devices and the examiner also had previously taken Official Notice that thin small outline package devices (TSOP) are conventional chip packages in the art. This alternative use of Fe-Ni alloy leads and the conventional use of TSOP devices is so well known in the art that Official Notice can be taken on these issues. It would have been obvious to one of ordinary skill in the art at the time the invention was made to use Fe-Ni alloys for the leads of Tanimoto because Fe-Ni alloys are understood in the art to be obvious alternatives to copper alloys for leads when thermal expansion issues, strength and expense are issues. In addition, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use the compositions of Tanimoto for TSOP devices because

Art Unit: 1775

Tanimoto clearly discloses the use for analogous devices and it would be understood that leads of TSOP devices would benefit from the same coating compositions.

6. As noted above, it would be understood by one of ordinary skill in the art that Tanimoto clearly discloses that reflow melting of his two layers is considered by Tanimoto to be his invention (e.g. see column 6, lines 7-19, for two-layers reflowed into a lower overall Bi content). Tanimoto, however, may not specifically show examples wherein reflowed electronic leads are coated with specific lead free solders. The examiner notes, however, that Tanimoto clearly discloses that the use of "Pb contained in the solder has an adverse affect on human bodies. For that reason, in spite of its excellent properties, use of the solder is shunned. Recently, therefore, Sn alloys which do not contain Pb, that is, Sn-Ag alloy, a Sn-Bi alloy, a Sn-In alloy and a Sn-Zn alloy have taken the place of the Pb-containing Sn alloy" (column 1, lines 60-65). From Tanimoto's statement on lead containing alloys it would be evident to one of ordinary skill in the art that Tanimoto clearly understands that lead containing alloys generally should not be used and that they have been replaced by lead free alloys in current practice. Therefore it would be understood by one of ordinary skill in the art at the time the invention was made that Tanimoto's invention, when taken in whole with his discussion of the recognized adverse affects of lead containing alloys, is contemplated for lead free alloys. In view of the above, the use of Sn-Bi and Sn-Bi-Ag reflowed alloy layers is clearly shown by Tanimoto and the use of lead free alloys with these Sn-Bi and Sn-Bi-Ag reflowed layers would be understood by one of ordinary skill in the art to be obvious since lead containing solders are disclosed to be shunned.

Response to Arguments

7. Applicant's arguments filed June 30, 2003 have been fully considered but they are not persuasive with regards to the remaining rejections.

8. Applicant's expressed abandonment of copending application No. 09/581,631 has overcome the provisional rejection of the claims under the judicially created doctrine of obviousness-type double patenting set forth in the last Office Action.

10. Regarding the rejection of claims 6-14, 19-23, 43-49, 62-67, 70-71 and 78-83 under 35 U.S.C. 103(a) as being unpatentable over Tanimoto (U.S. Patent 6,110,608), applicant has submitted a Declaration Under 37 CFR 1.132 by Masahide Okamoto to show that the applicant's invention is patentably distinct from the articles described by the Tanimoto reference. The examiner has carefully reviewed the Okamoto declaration and has not found it completely convincing in its current form. A 132 declaration should endeavor to compare the closest prior art with the applicant's claimed invention. The examiner notes that Tanimoto's closest embodiments to the applicant's claimed invention are not dual Sn/SnBi layer embodiments, but rather the SnBi/SnBi dual layer embodiments of Tanimoto. Example 44 in Table 3 has been specifically discussed in the rejection of the claims and is an excellent example of this type of structure. In addition, since applicant is trying to distinguish applicant's product over the products that would be produced by Tanimoto's embodiments, applicant should have used reflow processing conditions that are essentially the same as Tanimoto's disclosed reflow conditions or at least their comparable equivalent conditions. It is not clear if applicant's reflow conditions in

Art Unit: 1775

the 132 declaration's examples (220°C for 10 seconds) can be considered comparable in results to the reflow processing conditions of Tanimoto (e.g. 750°C at 50-70 m/minutes ;see column 9, lines 24-39; Tables 2-3). Applicant may wish to submit a supplemental 132 declaration addressing the issues, above.

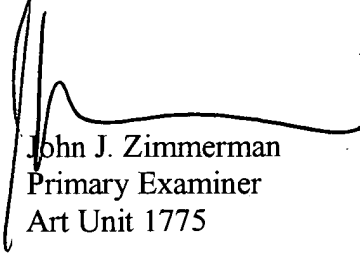
Conclusion

9. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a). A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the mailing date of this final action.

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to John J. Zimmerman whose telephone number is (703) 308-2512. The examiner can normally be reached on 8:30am-5:00pm, M-F. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9310 for regular communications and (703) 872-9311 for After Final communications. Any inquiry of a general

Art Unit: 1775

nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0661.



John J. Zimmerman
Primary Examiner
Art Unit 1775

jjz
July 18, 2003